

Cal/Ecotox

Toxicity Data for Double-crested Cormorant (*Phalacrocorax auritus*)^{*}

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Chemical	Tox Exposure	Endpoint Type	Endpoint Description	Endpoint Value	Note	Reference
CADMIUM (elemental); MERCURY (elemental)	0.03-6.3 ug Cd/g kidney, 0.77-12.9 ug Hg/g kidney, dry wt	TOX-EXP IND - biomarkers	correlation of mean metallothionein concentration (13.2-24.4 ug/g tissue) and metal concentrations in kidneys	no correlation	a	1
DDD (4,4'); DDE (4,4'); DDT (4,4'); DIELDRIN; HEPTACHLOR EPOXIDE; HEXACHLOROBENZENE; MERCURY COMPOUNDS; POLYCHLORINATED BIPHENYLS	mean ppm in 18 eggs, wet wt: 14.5 (DDE), 0.22 (DDT), 0.17 (DDD), 23.8 (PCBs), 0.33 (dieldrin), 0.04 (heptachlor epoxide), 0.01 (hexachlorobenzene), 0.46 (Hg)	TOX-REPRO - physiology	eggshell thickness compared with pre-1947 eggshells in contaminated colonies	23.9% thinner	b	2
DDD (4,4'); DDE (4,4'); DDT (4,4'); DIELDRIN; HEPTACHLOR EPOXIDE; HEXACHLOROBENZENE; MERCURY COMPOUNDS; POLYCHLORINATED BIPHENYLS	mean ppm, wet wt: 14.5 (DDE), 0.22 (DDT), 0.17 (DDD), 23.8 (PCBs), 0.33 (dieldrin), 0.04 (heptachlor epoxide), 0.01 (hexachlorobenzene), 0.46 (Hg)	TOX-REPRO - reproductive success	fledging success (young/nest) in contaminated colonies	0.06-0.11 (1972); 0.3 (1973)	c	2
DDD (4,4'); DDE (4,4'); DDT (4,4'); DIELDRIN; HEPTACHLOR EPOXIDE; HEXACHLOROBENZENE; MERCURY COMPOUNDS; POLYCHLORINATED BIPHENYLS	mean ppm in 18 eggs, wet wt: 14.5 (DDE), 0.22 (DDT), 0.17 (DDD), 23.8 (PCBs), 0.33 (dieldrin), 0.04 (heptachlor epoxide), 0.01 (hexachlorobenzene), 0.46 (Hg)	TOX-REPRO - reproductive success	mean hatching success in contaminated colonies	2.4%	d	2
DDD (4,4'); DDE (4,4'); DDT (4,4'); DIELDRIN; HEPTACHLOR EPOXIDE; HEXACHLOROBENZENE; MERCURY COMPOUNDS; POLYCHLORINATED BIPHENYLS	mean ppm in 18 eggs, wet wt: 14.5 (DDE), 0.22 (DDT), 0.17 (DDD), 23.8 (PCBs), 0.33 (dieldrin), 0.04 (heptachlor epoxide), 0.01 (hexachlorobenzene), 0.46 (Hg)	TOX-REPRO - reproductive success	percent of eggs lost or broken before hatching in contaminated colonies	95%	e	2
DDD (4,4'); DDE (4,4'); DDT (4,4'); POLYCHLORINATED BIPHENYLS	<0.1-0.08 ppm DDE, <0.01-0.5 ppm est. PCBs, <0.01-0.04 ppm DDD, <0.01-0.01 ppm DDT in dietary fish	TOX-EXP IND - accumulation	residues measured in live and dead eggs	10.4 ppm DDE, 8 ppm est. PCBs, <0.1 ppm DDD, 0.2 ppm DDT	f	3
DDD (4,4'); DDE (4,4'); DDT (4,4'); POLYCHLORINATED BIPHENYLS	<0.1-0.08 ppm DDE, <0.01-0.5 ppm est. PCBs, <0.01-0.04 ppm DDD, <0.01-0.01 ppm DDT in dietary fish	TOX-REPRO - physiology	correlation of egg concentration of DDE and est. PCB's and shell thickness and weight	negative correlation	g	3
DDD (4,4'); DDE (4,4'); DDT (4,4'); POLYCHLORINATED BIPHENYLS	<0.1-0.08 ppm DDE, <0.01-0.5 ppm est. PCBs, <0.01-0.04 ppm DDD, <0.01-0.01 ppm DDT in dietary fish	TOX-REPRO - physiology	eggshell thickness	decreased 8.3% compared with pre-1940 reference measurements	h	3
DDD (4,4'); DDE (4,4'); DDT (4,4'); POLYCHLORINATED BIPHENYLS	754 ppm DDE, 87 ppm PCBs, 2.1 ppm DDD, 7.0 ppm DDT in egg yolk lipids	TOX-REPRO - physiology	mean thickness of eggshells collected in 1969 compared with pre-1946 museum specimens	28.8% decrease	i	4
DDD (4,4'); DDE (4,4'); DDT (4,4'); POLYCHLORINATED BIPHENYLS	574 ppm DDE, 422 ppm PCBs, 13.8 ppm DDD, 5.5 ppm DDT in egg yolk lipids	TOX-REPRO - physiology	mean thickness of eggshells collected in 1969 compared with pre-1946 museum specimens	38.3% decrease	j	4
DDE (4,4'); POLYCHLORINATED BIPHENYLS	1.6 ppm wet wt DDE, 1.3 ppm wet wt PCBs	TOX-REPRO - physiology	shell thickness	no effect	k	5
MERCURY (elemental); POLYCHLORINATED BIPHENYLS	<0.05-0.11 PCBs, <0.05-0.11 mercury, 0.016-0.092 OC insecticides; ppm (wet wt) in fish	TOX-EXP IND - accumulation	concentration in carcass	0.24 ppm wet wt PCBs	l	6
MERCURY (elemental); POLYCHLORINATED BIPHENYLS	<0.05-0.11 PCBs, <0.05-0.11 mercury, 0.016-0.092 OC insecticides; ppm (wet wt) in fish	TOX-EXP IND - accumulation	concentration in eggs	5.7 ppm wet wt PCBs	m	6
MERCURY (elemental); POLYCHLORINATED BIPHENYLS	<0.05-0.11 PCBs, <0.05-0.11 mercury, 0.016-0.092 OC insecticides; ppm (wet wt) in fish	TOX-EXP IND - accumulation	concentration in liver	0.28 ppm wet wt mercury	n	6

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MERCURY (elemental); POLYCHLORINATED BIPHENYLS	<0.05-0.11 PCBs, <0.05-0.11 mercury, 0.016-0.092 OC insecticides; ppm (wet wt) in fish	TOX-EXP IND - accumulation	concentration in liver	7.98 ppm wet wt mercury	o	6
MERCURY (elemental); POLYCHLORINATED BIPHENYLS	<0.05-0.11 PCBs, <0.05-0.11 mercury, 0.016-0.092 OC insecticides; ppm (wet wt) in fish	TOX-EXP IND - accumulation	mean concentration in eggs	0.29 ppm wet wt mercury	p	6
MERCURY (elemental); POLYCHLORINATED BIPHENYLS	<0.05-0.11 PCBs, <0.05-0.11 mercury, 0.016-0.092 OC insecticides; ppm (wet wt) in fish	TOX-EXP IND - accumulation	Ratio of carcass concentration (4.6 ppm wet wt) to dietary concentration of PCBs	250	q	6
MERCURY (elemental); POLYCHLORINATED BIPHENYLS	<0.05-0.11 PCBs, <0.05-0.11 mercury, 0.016-0.092 OC insecticides; ppm (wet wt) in fish	TOX-EXP IND - accumulation	Ratio of concentration in carcass (0.64 ppm wet wt mercury) to dietary concentration (fish)	14	r	6
PCB 126 (3,3',4,4',5-PENTACHLOROBIPHENYL)	0, 70, 175, 349, 698 ug/kg egg	TOX-MORT - dose-response data	mortality in treated embryos versus controls	increased @ 175, 349, 698 ug/kg egg	s	7
PCB 126 (3,3',4,4',5-PENTACHLOROBIPHENYL)	0, 70, 175, 349, 698 ug/kg egg	TOX-MORT - toxicity benchmarks	LD50 (95% confidence limits)	177 ug/kg egg (77-264)	t	7
PCB 126 (3,3',4,4',5-PENTACHLOROBIPHENYL)	0, 70, 175, 349, 698 ug/kg egg	TOX-REPRO - development	hepatic EROD activity in treated embryos versus controls	increased @ all doses	u	7
PCB 126 (3,3',4,4',5-PENTACHLOROBIPHENYL)	0, 70, 175, 349, 698 ug/kg egg	TOX-REPRO - development	incidence of developmental abnormalities, edema, body weight effects, spleen or gonad histopathologic anomalies, or sex ratio in treated embryos versus controls	no effect	v	7
PCB 126 (3,3',4,4',5-PENTACHLOROBIPHENYL)	0, 70, 175, 349, 698 ug/kg egg	TOX-REPRO - development	spleen weights in treated embryos versus controls	decreased @ 349 ug/kg egg	w	7
POLYCHLORINATED BIPHENYLS	131, 250, 276, 672, 1606 ng/kg Toxic Equivalency Factors measured in eggs	TOX-EXP IND - biomarkers	hepatic EROD activity	increased at 1606 ng/kg	x	8
POLYCHLORINATED BIPHENYLS	131, 250, 276, 672, 1606 ng/kg Toxic Equivalency Factors measured in eggs	TOX-EXP IND - biomarkers	linear regression of hepatic EROD activity or cyt P450 content on Toxic Equivalency Factors	positive regression	y	8
POLYCHLORINATED BIPHENYLS	131, 250, 276, 672, 1606 ng/kg Toxic Equivalency Factors measured in eggs	TOX-EXP IND - biomarkers	total hepatic cytochrome P450 content	increased at 1606 ng/kg	z	8
POLYCHLORINATED BIPHENYLS	3.6-7.3 ug/g wet wt	TOX-REPRO - development	incidence of deformities in live embryos relative to 2,3,7,8-TCDD equivalents of PCBs, PCDFs, and PCDDs	increase	aa	9
POLYCHLORINATED BIPHENYLS	NR	TOX-REPRO - development	incidence of embryonic deformities, depressed growth	review	ab	10
POLYCHLORINATED BIPHENYLS	131, 250, 276, 672, 1606 ng/kg Toxic Equivalency Factors measured in eggs	TOX-REPRO - development	linear regression of wing length on Toxic Equivalency Factors	negative regression	ac	8
POLYCHLORINATED BIPHENYLS	0,5,10,25,50,100,200,400,800 ug/kg egg	TOX-REPRO - development	weight of heart, liver and spleen versus controls	increased @ 5 ug/kg	ad	11
POLYCHLORINATED BIPHENYLS	0,5,10,25,50,100,200,400,800 ug/kg egg	TOX-REPRO - development	weights of heart, liver and spleen versus controls	increased at 5 ug/kg egg	ae	11
POLYCHLORINATED BIPHENYLS	7.34-8.22 ug/g egg (1.03 ug/g egg, reference site)	TOX-REPRO - physiology	clutch size	decreased compared with reference	af	12
POLYCHLORINATED BIPHENYLS	131, 250, 276, 672, 1606 ng/kg Toxic Equivalency Factors measured in eggs	TOX-REPRO - physiology	Mean yolk weight of eggs	decreased at 276, 672, 1606 ng/kg	ag	8
POLYCHLORINATED BIPHENYLS	7.34-8.22 ug/g egg (1.03 ug/g egg, reference site)	TOX-REPRO - physiology	proportion of nestlings with bill defects	increased compared with reference	ah	12

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Chemical	Tox Exposure	Endpoint Type	Endpoint Description	Endpoint Value	Note	Reference
POLYCHLORINATED BIPHENYLS	35-344 pg TCDD eq/g wet wt	TOX-REPRO - reproductive success	correlation of embryo mortality with TCDD equivalents in eggs	positive correlation	ai	13
POLYCHLORINATED BIPHENYLS	7.34-8.22 ug/g egg (1.03 ug/g egg, reference site)	TOX-REPRO - reproductive success	hatching success (# hatched/# eggs)	decreased compared with reference	aj	12
POLYCHLORINATED BIPHENYLS	0.5,10,25,50,100,200,400,800 ug/kg egg	TOX-REPRO - reproductive success	incidence of embryo mortality versus controls	increased at 400, 800 ug/kg egg	ak	11
POLYCHLORINATED BIPHENYLS	NR	TOX-REPRO - reproductive success	incidence of reproductive effects	review	al	10
POLYCHLORINATED BIPHENYLS; POLYCHLORINATED DIBENZO-P-DIOXINS	NR	TOX-EXP IND - biomarkers	enzyme induction	review	am	10
POLYCHLORINATED DIBENZO-P-DIOXINS	100 ug/kg egg	TOX-EXP IND - biomarkers	P-450-dependent arachidonic acid metabolism by liver microsomes	increased	an	14
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	5.8-24.4 pgTCDD equivalents/g fish, wet wt, (5 sites)	TOX-EXP IND - accumulation	mean biomagnification factor for eggs from forage fish	31.3	ao	15
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	24.4 pg TCDD equivalents/g fish, wet wt	TOX-EXP IND - accumulation	pg TCDD equivalents accumulated per gram of body weight gained (from eggs to largest chicks)	162.4 pg/g bw gained (wet wt)	ap	15
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	5.8 pg TCDD equivalents/g fish, wet wt	TOX-EXP IND - accumulation	pg TCDD equivalents accumulated per gram of body weight gained from egg to largest chick stage	100.4 pg/g bw gained (wet wt)	aq	15
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	18.1 pg TCDD equivalents/g fish, wet wt	TOX-EXP IND - accumulation	pg TCDD equivalents accumulated per gram of body weight gained (from eggs to largest chicks)	37.6 pg/g bw gained (wet wt)	ar	15
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	7.6 pg TCDD equivalents/g fish, wet wt	TOX-EXP IND - accumulation	pg TCDD equivalents accumulated per gram of body weight gained (from eggs to largest chicks)	28.3 pg/g bw gained (wet wt)	as	15
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	11.1 pg TCDD equivalents/g fish, wet wt	TOX-EXP IND - accumulation	pg TCDD equivalents accumulated per gram of body weight gained (from eggs to largest chicks)	47.5 pg/g bw gained (wet wt)	at	15
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 1, 3, 10, 100 ug/kg	TOX-EXP IND - biomarkers	hepatic microsomal cytP450 content	increased at 10, 100 ug/kg	au	16
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 1, 3, 10, 100 ug/kg	TOX-EXP IND - biomarkers	hepatic microsomal EROD activity	increased at 3, 10, 100 ug/kg	av	16
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 1, 3, 5.4, 10.7, 11.7 ug/kg egg	TOX-MORT - dose-response data	mortality in treated embryos versus controls	increased @ 5.4, 10.7, 11.7 ug/kg egg	aw	7
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 1, 3, 5.4, 10.7, 11.7 ug/kg egg	TOX-MORT - toxicity benchmarks	LD50 (95% confidence limits)	4.0 ug/kg egg (0.8-7.2)	ax	7
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 1, 3, 10, 100 ug/kg	TOX-REPRO - development	body and organ weights	no effect	ay	16
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 1, 3, 10, 100 ug/kg	TOX-REPRO - development	edema	observed at 3, 10, 100 ug/kg	az	16
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 1, 3, 5.4, 10.7, 11.7 ug/kg egg	TOX-REPRO - development	hepatic EROD activity in treated embryos versus controls	increased @ all doses	ba	7
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 1, 3, 5.4, 10.7, 11.7 ug/kg egg	TOX-REPRO - development	incidence of developmental abnormalities, edema, body weight effects, spleen or gonad histopathologic anomalies, or sex ratio in treated embryos versus controls	no effect	bb	7
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 1, 3, 5.4, 10.7, 11.7 ug/kg egg	TOX-REPRO - development	spleen weights in treated embryos versus controls	decreased @ 5.4, 11.7 ug/kg egg	bc	7
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 0.06,0.25,1.0,4.0 ug/kg egg	TOX-REPRO - development	weight of brain, heart, liver and spleen versus controls	no effect	bd	11

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Chemical	Tox Exposure	Endpoint Type	Endpoint Description	Endpoint Value	Note	Reference
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0,0.06,0.25,1,0.4,0 ug/kg egg	TOX-REPRO - reproductive success	incidence of embryo mortality versus controls	increased at 4.0 ug/kg egg	be	11
TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-)	0, 1, 3, 10, 100 ug/kg	TOX-REPRO - reproductive success	mortality	observed at 3, 10, 100 ug/kg	bf	16

Notes

- a Both Adult and Juv.; CANADA; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=7440-43-9; TOX - Chemical=7439-97-6; N=24 birds; May; Heron Is., Manawagonish Is., Ile aux pommes; Tox Exp Tech=NR; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=N; lead and trace elements also measured in tissues
- b Embryo; MI; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=72-54-8; TOX - Chemical=72-55-9; TOX - Chemical=50-29-3; TOX - Chemical=60-57-1; TOX - Chemical=1024-57-3; TOX - Chemical=118-74-1; TOX - Chemical=MERCURY COMPOUNDS; TOX - Chemical=1336-36-3; N=18 eggs; Lake Huron; Tox Exp Tech=in ovo; Tox Exp Dur=NR; Tox Study Dur=2 yr; Tox Stat Sig=NR; Eggshell thickness was not significantly correlated with contaminant levels in eggs.
- c Embryo; MI; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=72-54-8; TOX - Chemical=72-55-9; TOX - Chemical=50-29-3; TOX - Chemical=60-57-1; TOX - Chemical=1024-57-3; TOX - Chemical=118-74-1; TOX - Chemical=MERCURY COMPOUNDS; TOX - Chemical=1336-36-3; N=42 (1973)-66 (1972) nests; Lake Huron; Tox Exp Tech=in ovo; Tox Exp Dur=NR; Tox Study Dur=2 yr; Tox Stat Sig=NR
- d Embryo; MI; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=72-54-8; TOX - Chemical=72-55-9; TOX - Chemical=50-29-3; TOX - Chemical=60-57-1; TOX - Chemical=1024-57-3; TOX - Chemical=118-74-1; TOX - Chemical=MERCURY COMPOUNDS; TOX - Chemical=1336-36-3; N=331 eggs; Lake Huron; Tox Exp Tech=in ovo; Tox Exp Dur=NR; Tox Study Dur=1 yr; Tox Stat Sig=NR
- e Embryo; MI; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=72-54-8; TOX - Chemical=72-55-9; TOX - Chemical=50-29-3; TOX - Chemical=60-57-1; TOX - Chemical=1024-57-3; TOX - Chemical=118-74-1; TOX - Chemical=MERCURY COMPOUNDS; TOX - Chemical=1336-36-3; N=235 eggs; Lake Huron; Tox Exp Tech=in ovo; Tox Exp Dur=NR; Tox Study Dur=2 yr; Tox Stat Sig=NR; Most eggs that were lost were found as fragments near nest or disappeared.
- f Adult; CANADA; MN; ND; WI; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=72-54-8; TOX - Chemical=72-55-9; TOX - Chemical=50-29-3; TOX - Chemical=1336-36-3; N=11 colonies; Tox Exp Tech=parent diet; Tox Study Dur=NR; Tox Stat Sig=NR
- g Adult; CANADA; MN; ND; WI; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=72-54-8; TOX - Chemical=72-55-9; TOX - Chemical=50-29-3; TOX - Chemical=1336-36-3; TOX - Dose-Response Data Format=DR Figure; N=35 eggs; Tox Exp Tech=parent diet; Tox Study Dur=NR; Tox Stat Sig=Y
- h Adult; CANADA; MN; ND; WI; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=72-54-8; TOX - Chemical=72-55-9; TOX - Chemical=50-29-3; TOX - Chemical=1336-36-3; N=35 eggs; Tox Exp Tech=parent diet; Tox Study Dur=NR; Tox Stat Sig=NR
- i Adult; CA; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=72-54-8; TOX - Chemical=72-55-9; TOX - Chemical=50-29-3; TOX - Chemical=1336-36-3; N=17 eggs; Anacapa Island; Tox Exp Tech=parent diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=Y
- j Adult; CA; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=72-54-8; TOX - Chemical=72-55-9; TOX - Chemical=50-29-3; TOX - Chemical=1336-36-3; N=23 eggs; Los Coronados Island; Tox Exp Tech=parent diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=Y
- k Adult; OR; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=72-55-9; TOX - Chemical=1336-36-3; N=10 eggs from 10 nests; June; OR coast; Tox Exp Tech=dietary; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- l Juvenile; SD; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=7439-97-6; TOX - Chemical=1336-36-3; N=5 birds; Age=2-4 wks old; spring; Lake Pointsett, Dry Lake; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- m Adult; SD; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=7439-97-6; TOX - Chemical=1336-36-3; N=5 eggs; spring; Lake Pointsett, Dry Lake; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- n Nestling; SD; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=7439-97-6; TOX - Chemical=1336-36-3; N=5 birds; Age=2-4 wks old; spring; Lake Pointsett, Dry Lake; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- o Adult; SD; B; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=7439-97-6; TOX - Chemical=1336-36-3; N=5 birds; spring; Lake Pointsett, Dry Lake; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- p Adult; SD; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=7439-97-6; TOX - Chemical=1336-36-3; N=5 eggs; spring; Lake Pointsett, Dry Lake; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- q Adult; SD; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=7439-97-6; TOX - Chemical=1336-36-3; N=10 carcasses; spring; Lake Pointsett, Dry Lake; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- r Adult; SD; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=7439-97-6; TOX - Chemical=1336-36-3; N=10 carcasses; spring; Lake Pointsett, Dry Lake; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- s Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=57465-28-8; TOX - Dose-Response Data Format=DR Table; N=83-86 eggs/treatment; Lake Winnipegosis, Manitoba; Tox Exp Tech=egg yolk injection; Tox Exp Dur=26-28 d; Tox Study Dur=26-28 d; Tox Stat Sig=Y
- t Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=57465-28-8; TOX - Dose-Response Data Format=DR Table; N=83-86 eggs/treatment; Lake Winnipegosis, Manitoba; Tox Exp Tech=egg yolk injection; Tox Exp Dur=26-28 d; Tox Study Dur=26-28 d; Tox Stat Sig=Y; PCB 126 toxic equivalency factor was 0.023 (0.010-0.027).
- u Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=57465-28-8; TOX - Dose-Response Data Format=DR Table; N=83-86 eggs/treatment; Lake Winnipegosis, Manitoba; Tox Exp Tech=egg yolk injection; Tox Exp Dur=26-28 d; Tox Study Dur=26-28 d; Tox Stat Sig=Y; EROD stands for ethoxyresorufin-O-deethylase.
- v Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=57465-28-8; TOX - Dose-Response Data Format=DR Table; N=83-86 eggs/treatment; Lake Winnipegosis, Manitoba; Tox Exp Tech=egg yolk injection; Tox Exp Dur=26-28 d; Tox Study Dur=26-28 d; Tox Stat Sig=N
- w Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=57465-28-8; TOX - Dose-Response Data Format=DR Table; N=83-86 eggs/treatment; Lake Winnipegosis, Manitoba; Tox Exp Tech=egg yolk injection; Tox Exp Dur=26-28 d; Tox Study Dur=26-28 d; Tox Stat Sig=Y

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- x Hatchling; CANADA; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; TOX - Dose-Response Data Format=DR Table; N=5-12 eggs/dose; Saskatchewan, British Columbia, Lake Ontario; Tox Exp Tech=in ovo; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=Y
- y Hatchling; CANADA; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; TOX - Dose-Response Data Format=DR Table; N=5-12 eggs/dose; Saskatchewan, British Columbia, Lake Ontario; Tox Exp Tech=in ovo; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=Y; also positive regression on PCB-105, -118, -77, -126, -169
- z Hatchling; CANADA; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; TOX - Dose-Response Data Format=DR Table; N=5-12 eggs/dose; Saskatchewan, British Columbia, Lake Ontario; Tox Exp Tech=in ovo; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=Y
- aa Embryo; MI; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; N=NR; Lakes Michigan, Huron, Superior, North Channel; Tox Exp Tech=in ovo; Tox Exp Dur=10-12 days and 21-24 days (embryo ages); Tox Study Dur=NR; Tox Stat Sig=NR
- ab Embryo; Juvenile; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; N=NR; Tox Exp Tech=NR; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- ac Hatchling; CANADA; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; TOX - Dose-Response Data Format=DR Table; N=5-12 eggs/dose; Saskatchewan, British Columbia, Lake Ontario; Tox Exp Tech=in ovo; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=Y; also negative regression on PCB-169
- ad Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; TOX - Dose-Response Data Format=DR Table; N=15-60/group; Tox Exp Tech=egg injection; Tox Exp Dur=incubation period; Tox Study Dur=incubation period; Tox Stat Sig=Y; No effect observed on brain weight.
- ae Hatchling; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; TOX - Dose-Response Data Format=DR Table; N=8-29/group; Tox Exp Tech=egg injection; Tox Exp Dur=incubation period; Tox Study Dur=incubation period; Tox Stat Sig=Y
- af Adult; WI; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; N=466 and 953 nests (2 yrs); Spider Is., Lake Michigan; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=in ovo; Tox Stat Sig=Y
- ag Both Adult and Juv.; CANADA; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; TOX - Dose-Response Data Format=DR Table; N=5-12 eggs/dose; Saskatchewan, British Columbia, Lake Ontario; Tox Exp Tech=in ovo; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=Y
- ah Hatchling; WI; B; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; N=1,511 and 2,700 chicks (2 yrs); Spider Is., Lake Michigan; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=in ovo; Tox Stat Sig=Y
- ai Embryo; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; TOX - Dose-Response Data Format=DR Figure; N=11 colonies @ 25-50 nests/colony; Great Lakes; Tox Exp Tech=in ovo; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=Y
- aj Hatchling; WI; B; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; N=466 and 953 nests (2 yrs); Spider Is., Lake Michigan; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=in ovo; Tox Stat Sig=Y
- ak Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; TOX - Dose-Response Data Format=DR Table; N=15-60/group; Tox Exp Tech=egg injection; Tox Exp Dur=incubation period; Tox Study Dur=incubation period; Tox Stat Sig=Y; 100% mortality at 800 ug/kg egg
- al Both Adult and Juv.; Embryo; Species - California (R)=*Phalacrocorax auritus*; Species - California (R)=*Anas platyrhynchos*; TOX - Chemical=1336-36-3; N=NR; Tox Exp Tech=NR; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- am Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1336-36-3; TOX - Chemical=POLYCHLORINATED DIBENZO-P-DIOXINS; N=NR; Tox Exp Tech=NR; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- an Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=POLYCHLORINATED DIBENZO-P-DIOXINS; N=3; Age=1 day; Tox Exp Tech=egg injection; Tox Exp Dur=5-6 d; Tox Study Dur=5-6 d; Tox Stat Sig=NR; See citation for comparisons with chick, pigeon, and great blue heron responses.
- ao Adult; F; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; N=12 eggs/site x 5 sites; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- ap Nestling; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; N=20 chicks; Green Bay, Lake Michigan; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- aq Nestling; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; N=20 chicks; Beaver Islands, Lake Michigan; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- ar Nestling; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; N=20 chicks; Thunder Bay, Lake Huron; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- as Nestling; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; N=20 chicks; North Channel, Lake Huron; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- at Nestling; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; N=20 chicks; St. Martin's Shoal, Lake Huron; Tox Exp Tech=diet; Tox Exp Dur=NR; Tox Study Dur=NR; Tox Stat Sig=NR
- au Hatchling; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; TOX - Dose-Response Data Format=DR Table; N=6-10 eggs/dose; Tox Exp Tech=egg injection; Tox Exp Dur=incubation day 22 to hatch; Tox Study Dur=NR; Tox Stat Sig=Y
- av Hatchling; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; TOX - Dose-Response Data Format=DR Figure; N=6-10 eggs/dose; Tox Exp Tech=egg injection; Tox Exp Dur=incubation day 22 to hatch; Tox Study Dur=NR; Tox Stat Sig=NR
- aw Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; TOX - Dose-Response Data Format=DR Table; N=83-86 eggs/treatment; Lake Winnipegosis, Manitoba; Tox Exp Tech=egg yolk injection; Tox Exp Dur=26-28 d; Tox Study Dur=26-28 d; Tox Stat Sig=Y
- ax Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; TOX - Dose-Response Data Format=DR Table; N=83-86 eggs/treatment; Lake Winnipegosis, Manitoba; Tox Exp Tech=egg yolk injection; Tox Exp Dur=26-28 d; Tox Study Dur=26-28 d; Tox Stat Sig=Y
- ay Hatchling; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; N=6-10 eggs/dose; Tox Exp Tech=egg injection; Tox Exp Dur=incubation day 22 to hatch; Tox Study Dur=NR; Tox Stat Sig=N
- az Hatchling; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; TOX - Dose-Response Data Format=DR Table; N=6-10 eggs/dose; Tox Exp Tech=egg injection; Tox Exp Dur=incubation day 22 to hatch; Tox Study Dur=NR; Tox Stat Sig=NR
- ba Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; TOX - Dose-Response Data Format=DR Table; N=83-86 eggs/treatment; Lake Winnipegosis, Manitoba; Tox Exp Tech=egg yolk injection; Tox Exp Dur=26-28 d; Tox Study Dur=26-28 d; Tox Stat Sig=Y; EROD stands for ethoxresorufin-O-deethylase.
- bb Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; TOX - Dose-Response Data Format=DR Table; N=83-86 eggs/treatment; Lake Winnipegosis, Manitoba; Tox Exp Tech=egg yolk injection; Tox Exp Dur=26-28 d; Tox Study Dur=26-28 d; Tox Stat Sig=N

Toxicity Data for Double-crested Cormorant (*Phalacrocorax auritus*)

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bc Embryo; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; TOX - Dose-Response Data Format=DR Table; N=83-86 eggs/treatment; Lake Winnipegosis, Manitoba; Tox Exp Tech=egg yolk injection; Tox Exp Dur=26-28 d; Tox Study Dur=26-28 d; Tox Stat Sig=Y; Bursa weights were also reduced at 11.7 ug/kg egg.

bd Hatchling; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; N=NR; Tox Exp Tech=egg injection; Tox Exp Dur=incubation period; Tox Study Dur=incubation period; Tox Stat Sig=N

be Hatchling; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; TOX - Dose-Response Data Format=DR Table; N=58-60/group; Tox Exp Tech=egg injection; Tox Exp Dur=incubation period; Tox Study Dur=incubation period; Tox Stat Sig=Y

bf Hatchling; Lab; NR; Species - California (R)=*Phalacrocorax auritus*; TOX - Chemical=1746-01-6; TOX - Dose-Response Data Format=DR Table; N=6-10 eggs/dose; Tox Exp Tech=egg injection; Tox Exp Dur=incubation day 22 to hatch; Tox Study Dur=NR; Tox Stat Sig=NR

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